RANGE IMPROVEMENT NOTES

VOL. 9, NO. 2 APRIL 1964

INDEX

(AGRI.-OGDEN)

PUBLISHED BY INTERMOUNTAIN REGION. FOREST SERVICE., U.S. DEPT. AGRICULTURE..OGDEN. UTAH

STATEMENT OF PURPOSE

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This publication is printed primarily to inform professional range administrators of important range improvement and management developments and findings. These "notes" may include extracts of published papers, unpublished preliminary reports of research work, unpublished reports on administrative studies and personal observations or suggestions of other range administrators. No claim is made as to the accuracy or completeness of studies or conclusions drawn.

All who read these **RANGE IMPROVEMENT NOTES** are encouraged to submit material for publication, or suggestions for improving its usefulness. Full credit will be given for any material used.

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Effect of Grazing Intensity On Cattle Weights And Vegetation Of The Bighorn Experimental Pastures*

By A. A. Beetle, W. M. Johnson,
R. L. Lang, Morton May
D. R. Smith [1/]

DISCUSSION AND SUMMARY

Many factors contribute to changes in range vegetation. Some of these may be the direct effect of weather, principally rainfall. The production of herbage fluctuates from year to year with changes in weather.

Grazing also causes changes in the vegetation. Some of these are direct effects of grazing and some are indirect. May (1954) has shown that in the Bighorn experimental pastures, moisture/temperature relations in the soil strongly influence the seasonal aspect of the plant cover. One of the first effects of intensifying grazing is earlier maturing of the vegetation. This is brought about when mulch, which keeps the soil cool and moist, is eliminated.

Little mulch accumulates on heavily grazed ranges; its absence hastens warming of the soil and earlier development of the vegetation. Rauzi (1956) has shown through infiltration tests that the Owen Creek silt loam soils in the heavily used pastures in this study absorbed significantly less water for both the first and second 30-minute periods of infiltration tests than did similar soils in the lightly grazed pastures. This results in less moisture available for plant growth.

Some of the direct effects of grazing are illustrated by the reduction of vigor as measured by leaf height of Idaho fescue and by changes in cover and in production of the forage species. Soils influence the magnitude of the effect of grazing on plant vigor. On sedimentary soils no serious effect was observed until grazing approached the moderate rate. On granitic soils even light grazing reduced plant vigor. However, leaf height is only one factor to consider. The total herbage production is of greater importance in determining the degree of use the vegetation will stand.

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* Permission given by University of Wyoming Agricultural Experiment Station - January 1961 - Bulletin 373.

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Idaho fescue is the most important forage species on the Bighorn pastures (Beetle, 1956; Hurd, 1958). It was found that Idaho fescue grazed seasonlong would stand approximately 40 to 45 percent utilization. At this point Idaho fescue maintained production. It is obvious, however, that, if improvement in production is desired some lighter degree of grazing would be necessary. Even though the effect of utilization on the production of Idaho fescue was different on the two soil types, it is significant that this degree of use was about the same on both soils.

Other desirable species in the pastures did not show definite responses to grazing intensity. Sandberg bluegrass and canby bluegrass, less desirable species, increased when grazing exceeded 40 to 45 percent use on Idaho fescue. It is reasonable therefore that proper utilization of the grass/forb type on the Bighorn pastures grazed seasonlong, as were these pastures, should be approximately 40 to 45 percent utilization of Idaho fescue by weight.

At this rate of utilization animal gains are near optimum. Lighter rates of grazing result in higher gains per head per day but lower per-acre gain. Heavy rates of grazing produce more gain per acre but less gain per day. Johnson (1953), working in pine/bunchgrass ranges, found that, when market values are considered, total pounds of gain per acre lost some of its significance because animals from heavily grazed pastures sold for less per cwt. than animals from moderately grazed pastures.

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DON'T FORGET
that people will judge you by your
ACTIONS
not your
INTENTIONS.
You may have a heart of gold
But so has a hardboiled egg.

RECOMMENDED CONTROL METHODS TO PROTECT FROM ANIMAL LOSSES DUE TO HALOGETON*

John L. O'Harra, DVM, Director
Division of Animal Industry
Nevada Department of Agriculture

Methods to protect cattle and sheep from death losses due to excessive ingestion of Halogeton glomeratus may be divided into two categories - management practices and prophylactic measures.

1. Management Practices

   A. Starvation. Certain conditions due to floods, snow storms, drift fences or other causes may result in animals being isolated or held in areas where Halogeton is the only feed available. The resulting starvation without supplemental feeding or moving out of the area will necessarily result in heavy grazing on Halogeton with resulting losses.

   At certain times, when weather conditions are proper, frost will form on Halogeton making it highly palatable and greatly increases consumption where, otherwise, cattle and sheep would pick sparingly at the plant or ignore it all together.

   B. Depraved Appetites. The State of Nevada as a whole is a phosphorus deficient area. Lack of proper amounts of phosphorus in the forage of cattle and sheep may lead to a depraved appetite in these animals. Phosphorus deficient ruminants tend to chew on sticks, posts, leather, hides, bones, rocks and other foreign material and to eat plant materials that are high in salt. Animals with a depraved appetite upon drifting in to Halogeton beds, or areas where Halogeton is readily available, often tend to consume lethal quantities of this plant. It cannot be stated too strongly that correction of the phosphorus deficiency by proper mineral supplement, addition of good quality steam bonemeal, dicalcium phosphate or other phosphorus supplement to the ration will pay big dividends. This supplement not only increases gains and general thriftiness of the animal but protects from the depraved appetite which causes the animal to seek out toxic plants that will result in their ultimate death.

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* From RANGE & LIVESTOCK MANAGEMENT - Cooperative Extension Service, Max C. Fleishmann College of Agriculture, University of Nevada - January 1964.

C. Moving by Trailing or Truck. Halogeton often adapts itself and grows profusely in the trampled areas surrounding corrals and chutes where animals are routinely unloaded or handled year after year. Animals suffering from stress or hunger due to hauling should not be unloaded and left in heavy infested Halogeton areas. Hungry animals and animals suffering from stress of hauling will readily eat Halogeton where they would normally ignore it.

D. Bed Grounds, Salt Areas and Water Holes. Halogeton thrives in areas that are used as bedgrounds, salting areas and water holes. Animals, particularly sheep, bedded down in these areas, upon rising, tend to graze Halogeton excessively during the early hunger period. Avoidance of these areas will offer good protection.

E. Hysteria. Crowding or moving animals through Halogeton areas often results in their consuming this plant in an unnatural manner. Avoiding these areas while trailing or offering supplemental feed prior to driving through the areas will be good insurance against losses.

2. Prophylactic Measures

A. The tolerance of cattle and sheep to Halogeton is much greater if other roughage is available for their diet. The feeding of hay or other roughage or holding the animals in good grazing areas for a fill prior to contact with Halogeton areas raises their tolerance considerably. Cattle and sheep with a rumen relatively filled with nutritional grass or browse may consume considerably more than the toxic weight in Halogeton as compared to an empty digestive system.

B. Correction of Phosphorus Deficiency to Correct Depraved Appetites. As stated above, and it is well to repeat, phosphorus deficient cattle and sheep tend to seek out desert forage that is high in salt. The correction of this depraved appetite by addition of phosphorus in the form of bonemeal, dicalcium phosphate, mineral supplements, access to grazing areas that are fertilized with high phosphorus additions or other means will benefit in numerous ways.

C. Feeding of Dicalcium Phosphate. The feeding of 18 percent phosphorus in dicalcium phosphate in a salt mix or in pellets containing 5 to 7 percent dicalcium phosphate to sheep or 10 percent dicalcium phosphate to cattle is a good prophylactic measure in Halogeton areas. If the DCP is fed prior to access to Halogeton areas and simultaneous with grazing in heavy Halogeton, it is considered an excellent prophylactic treatment. Under certain conditions, DCP may be fed in pellets as supplemental feed. In many of the range areas, the feeding of DCP is unsatisfactory in that it will not lend itself to normal management procedures.

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SAFETY MESSAGE

VISUALIZE TO EMPHASIZE

POSTERS - displayed at locations where employees congregate or pass frequently.

BULLETIN BOARDS - for use in displaying posters, notices, safety equipment.

SAFETY SIGNS - to warn of hazard areas or give instructions.

BITTERBRUSH STOCKING AND MINIMUM SPACING WITH CRESTED WHEATGRASS*

By Richard L. Hubbard, Pinhaus Zusman
and H. Reed Sanderson
Pacific Southwest Forest and Range Experiment Station

The article appeared in the July 1962 CALIFORNIA FISH AND GAME

PRACTICAL IMPLICATIONS

On a good site, maximum bitterbrush stocking should be less than 2,200 plants per acre. Above this level, plants compete critically for soil moisture and space. But competition may not take effect while the plants are small and need little moisture; in the study plot, bitterbrush plants approached mature size before losses from lack of moisture occurred. The time needed for competition to develop is the main reason that plant condition proved to be a more sensitive measure of competition effects than plant size.

Competition between seeded bitterbrush plants probably will not destroy a stand. The stronger plants achieve dominance and the weaker die until, eventually, the stocking is in balance with the site. But all this takes time--important time. The longer it takes the more chance undesirable plants have to invade and enter the fight for critical moisture. Also, it means a longer time before plants become large enough to produce useful amounts of herbage. Every year of delay means a grazing loss. Furthermore, even the potentially dominant plants may be so reduced in vigor that they are easily damaged by grazing, insects, or disease.

Between overstocking and understocking with bitterbrush, slight understocking is preferable. Then the plants will be vigorous, will mature rapidly, and will produce herbage earlier. The crux of the problem is to set the minimum below which a seeding is a failure--the point where the value of herbage produced is not enough to offset the cost of establishment. This isn't an easy point to determine because (1) bitterbrush seedings are mainly for game use, and dollar values are not available for this type of grazing (2) it is difficult to determine herbage production.

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* From RANGE AND WILDLIFE ABSTRACTS - Rocky Mountain Region - October 24, 1963.

Natural bitterbrush stocking is considerably below the 2,200 plants per acre we recommend. In a study of natural bitterbrush stands in northern California, E. C. Nord (personal communication) found 778 plants per acre on the average and a maximum stocking of 1,420 plants. Even this maximum may be too few for artificially seeded areas.

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The HAVES and HAVE-NOTS
can often be traced back to
The DIDS and DID-NOTS.
D. O. Flynn -
SATURDAY EVENING POST

Probably the meek
really will
inherit the earth
They won't have the nerve to refuse.
Ottawa, Iowa, SENTINEL,
quoted by John M. Henry in McCALLS

Range Revegetation on the Cache National Forest

By Hallie Cox*

Revegetating deteriorated Forest Service rangelands is necessary where satisfactory forage production and soil stability cannot be accomplished within a reasonable length of time through proper stocking and management. On many areas of deteriorated rangelands, satisfactory improvements can be expected by the removal of competing undesirable plants. Planning is an essential step in the successful execution of range revegetation projects. Many factors are to be considered in the development plan:

1. Selection of suitable areas for cultural treatment
2. Management goals
3. Permittee cooperation
4. Coordination with other uses
5. Studies planned
6. Financial needs

How then do we determine if range seeding and undesirable plant control should be applied to any particular area? The extreme site variations that occur within a grazing allotment make any set rules impossible. The first step then is to make a complete site analysis of the area that has been proposed for cultural treatment. This analysis will furnish much valuable information to aid the land manager in determining which type of cultural treatment can be expected to yield the best results. Questions that may be answered by this site analysis are: (1) The present vegetative condition as expressed by composition and vigor, (2) indications of site productivity from residual vegetation, (3) present soil condition, ground cover, and erosion, (4) potential of the site, soil depth, and texture, and (5) suitability of terrain to cultural treatment.

The site analysis is a basis for furnishing the information necessary to justify the type of cultural treatment to be used. From the present condition of the site and the residual vegetation, it can be determined which method of treatment may be expected to yield the greatest return for the cost.

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* Range Staff Officer - Cache National Forest, Logan, Utah

In addition to the above, the site analysis provides a recorded base against which results can be measured and evaluated.

After it has been determined that a selected site should respond to cultural treatment, there must be assurance that the area can be properly managed under an attainable management system. To do this, goals are set for the protection and future management of each unit.

Proper management of treated areas requires full cooperation by users. This cooperation is covered by written agreements with the permittees which cover all phases of the program planned for the development of the allotment. Included in the agreement are such items as permittee cooperation in the actual work, recognition of allotment conditions, needed adjustments and the agreed-upon responsibilities of the Forest Service and the permittees in carrying out the management program.

Range revegetation work on Cache National Forest lands is further coordinated with the management direction and guides contained in the Northeast Utah Subregion Multiple Use Guide, and with the management decisions in Ranger District Multiple Use Plans. To properly correlate cultural treatments with other resource values, multiple use impact surveys are made. The survey is a means of showing that consideration is given to the needs of wildlife, watershed, timber, recreation, and other multiple uses on or adjacent to the area to be treated.

To properly evaluate the results of cultural treatments and the effects of grazing use on the treated areas, permanent studies are established prior to treatment. A suitable bench mark area is selected on which the study is to be made. These bench marks are representative of the area being treated and so located that they will be sensitive to changes in livestock management. The study established on a bench mark area prior to treatment requires permanent photo points and a site analysis. The beginning points of each leg of a Parker 3-Step transect have been used as the permanent photo point in Cache studies. The site analysis made prior to treatment and subsequent production and grazing impact measurements are all made parallel to the Parker 3-Step. The permanently marked points along the Parker 3-Step transect are used as reference points to assure that the production and grazing impact studies are representative of the same area each year. The photographs taken from the photo points can furnish a very good visual record of the results of the cultural treatment and the grazing impact.

To properly evaluate the results of the management program and to use the studies on the bench mark areas as a guide to managing the balance of the grazing unit or allotment, proper use criteria must be established. The proper use criteria will specify the percent utilization of key species and the degree of soil disturbance that will be allowable under the management program that is established. Under a rotation-type grazing system the proper use criteria will specify the degree of grazing impact that will be allowed for the unit under the various intensities of grazing as light, moderate, and heavy.

The results of the procedures described for recording revegetation accomplishments and grazing use on the Cache National Forest are illustrated in Table I, and by figures 1 through 6, which follow:

TABLE I

Summary of Site Analysis on Saddle Creek

Production pounds per acre in air-dry weight

	6/16/61 Before Spraying	7/18/63 After Spraying
Grasses	376	1,213
Forbs	107	260
Shrubs	70	0
TOTAL	553	1,473
Overstory shrub	16	0
Bare ground	37	15
Vegetation and litter	63	85
Species Composition		
Decreaser and increaser	81	97
Invader	19	3

Soil Characteristics

Parent material	- limestone
Depth	- Deep 37+
Texture	- Loam

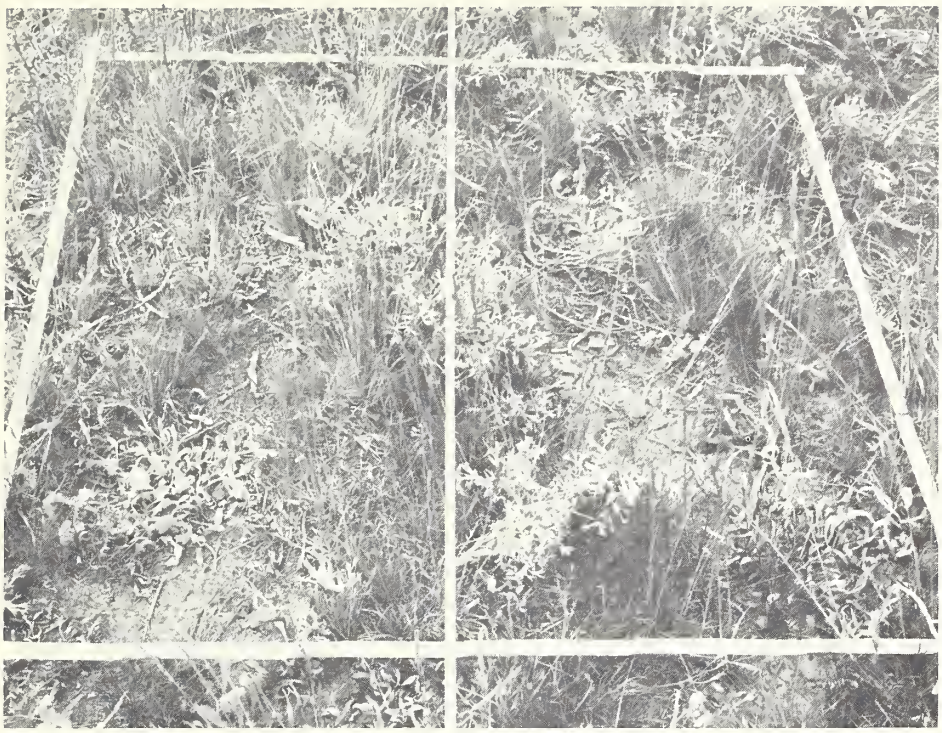

Fig. 1 - Closeup of Saddle Creek Parker 3-Step Transect Established June 16, 1961, prior to spraying with 2, 4-D.

Fig. 2 - General view - production 553 pounds per acre

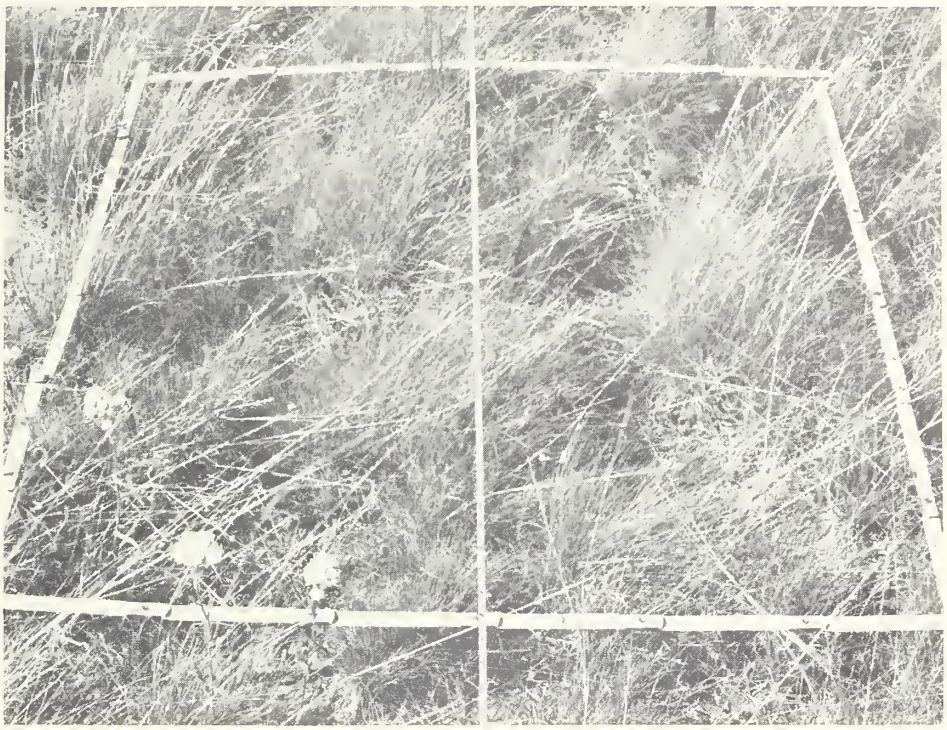

Fig. 3 - Saddle Creek - same 3-Step transect, July 18, 1963. Two years after spraying - the day cattle were turned into area.

Fig. 4 - General view - Production 1,473 pounds per acre

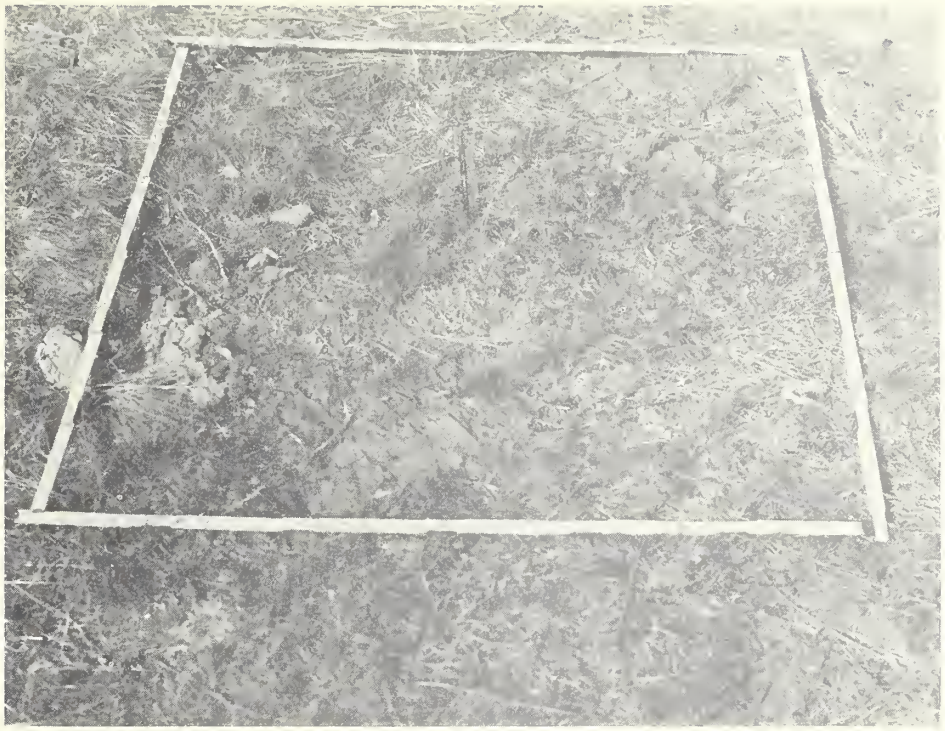

Fig. 5 - Same as Figs. 1 and 3. Photo taken September 16, 1963, after two months grazing use.

Fig. 6 -Same as Figs. 2 and 4. Vegetation remaining 590 pounds per acre - Utilization 60%. Unit will be grazed late in 1964 and rested in 1965.

BETENSON FLAT RIPPING PROJECT

By
Dee R. Ritchie[1/] and Grant G. Williams[2/]

Forage production in 1945 was very light on Dry Flat (later renamed Betenson Flat) located on the east fork of the Beaver River above Beaver, Utah, at an elevation of 10,000 feet (Figure 1). To improve conditions the flat was plowed with a moldboard plow and drilled. The grass mixture planted consisted of smooth bromegrass, tall oatgrass, timothy, orchardgrass, alfalfa, and slender wheatgrass. Initial results were spectacular, with grass three to four feet tall. Grazing use was resumed late in the summer of 1947 (Figure 2). Production has steadily decreased since that time and patches of bare soil have reappeared throughout the area (Figure 3).

Several reasons have been advanced to account for the decline in forage production. Among these are lack of fertility, soil compaction, too heavy grazing use, a sod bound situation, and soil-water relationships.

Fertilization trials were made without measurable increases in forage yield. Vegetation color changes were noted on fertilized plots. Designed to assess the effect of breaking up the grass sod a ripping test was initiated in 1962. This practice, it was believed, should improve soil-water relationships, alleviate soil compaction and improve soil aeration.

A heavy road ripper was used in the test. This equipment was not considered to be the best tool with which to do the job, but was used because it was the only equipment available (Figures 4 and 5). The response from the treatment was very good. Production of forage on the area ripped was only 266 pounds per acre before ripping. The average grass height was four to six inches (Figure 3). After ripping production was increased five times, from 266 pounds to 1,032 pounds of forage per acre. The average grass height from 4 to 6 inches to 28 inches (Figure 6).

There will be followup on the results of this study each year to determine how long the response from ripping will last.

1/ District Forest Ranger, Beaver District, Fishlake N. F.
2/ Forester, Range Staff Officer, Fishlake National Forest.

Fig. 1 - Dry Flat on east fork of Beaver River in 1945. Closeup of natural forage consisting mostly of Closely grazed dandelions. Elevation 10,000 ft.

Fig. 2 - Cattle grazing on Dry Flat at the head of east fork of Beaver River in September 1947 - the second season following planting.

Fig. 3 - Dry Flat (Betenson Flat) untreated area - 1962. Average grass height is 4 to 6 inches. Production 266 pounds of forage per acre.

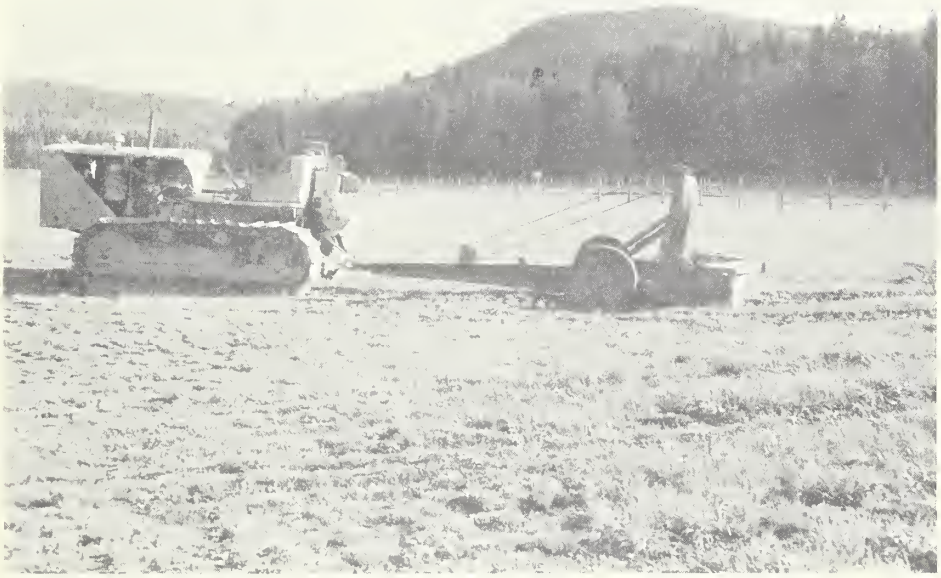

Fig. 4 - Road ripper used to rip Betenson Flat, Spring of 1962. Ripping depth 24 inches. Not an ideal tool for the job, but all that was available for the trial.

Fig. 5 - Ripper furrows on Betenson Flat about five feet apart - Spring 1962.

Fig. 6 - Ripped area on Betenson Flat - Summer 1963. Average height of grass 28 inches. Production 1,032 pounds of forage per acre.